

REMARKS

Claims 38-41 and 163-168 are pending in the Application.

Claims 38-41 are rejected.

Claims 163-168 are objected to.

Claims 38, 41, 163, 164, 165 and 167 are amended herein.

I. REJECTION UNDER 35 U.S.C. § 112, ¶ 2

Examiner has rejected Claim 41 under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Examiner states that “Claim 41 states that the subarrays are made by providing at least about 10^6 tubular carbon molecules. Claim 38, to which it depends, however, requires that the subarrays contain up to 10^6 single-wall carbon nanotubes. It is indefinite as to whether up to 10^6 nanotubes are required or whether at least 10^6 nanotubes are required. Additionally, it is noted that the “tubular carbon molecules” of claim 41 must be single-walled nanotubes; it is suggested that the claim be amended to read as such.” Office Action, at 2.

As Examiner suggested, Applicant has amended Claim 41 with the substitution of “single-wall carbon nanotubes” for “tubular carbon molecules.” Applicant has also amended Claim 38 to require “at least 10^6 single-wall carbon nanotubes” to conform to the Specification and Claim 41.

Accordingly, as Claims 41 and 38 have been amended make the claims consistent and definite, Applicant respectfully requests Examiner to withdraw his rejection of 41 under 35 U.S.C. § 112, ¶ 2.

II. REJECTION UNDER 35 U.S.C. § 102(b) AS ANTICIPATED BY KIANG-JPC

Examiner has rejected Claim 38 under 35 U.S.C. § 102(b) as being anticipated by Kiang et al. “Structural Modification of Single-Layer Carbon Nanotubes with an Electron Beam,” *J. Phys. Chem.* 1996, 100, 3749-3752, (“Kiang- JPC”). Office Action at 2.

Examiner contends that “Kiang et al. shows the process of single-wall nanotube bundling. The assembly of the bundles during the formation of single-wall nanotubes is due to van der Waals forces, with tubes progressively zipping together. Kiang et al. also teach the movement of single-wall nanotubes into a bundle when heated by an electron beam. Both of these processes represent a step of assembling a composite array of single-walled nanotubes from subarrays of single-walled nanotubes.” Office Action, at 3.

Anticipation requires each and every element of the claim to be found within the cited prior art reference.

As noted above, Claim 38 has been amended to require subarrays of at least about 10^6 single-wall carbon nanotubes. *Kiang-JPC* does not teach a subarray of at least about 10^6 single-wall carbon nanotubes, and therefore cannot be anticipated by *Kiang-JPC*.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claim 38 under 35 U.S.C. § 102(b) as being anticipated by *Kiang-JPC*.

III. REJECTIONS UNDER 35 U.S.C. § 102(b) or § 103(a) OVER KIANG-JPC

Examiner has rejected Claim 39-40 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over *Kiang- JPC*. Office Action at 3.

Examiner applied Kiang et al. as above and noted that “from the applicant’s specification that the “type” of nanotube refers to its helicity, which is represented by helicity indexes of (n,m), of which there are two major types. Bundles of single-walled nanotubes consisting solely of each type of nanotube (i.e. the same helicity throughout) are expected to exist in a nanotube sample. Therefore, it is expected that the process of assembly composite arrays, or bundles,

takes place between subarrays, or bundles, of the same type as well as subarrays, or bundles, of differing types.” Office Action, at 4.¹

Anticipation requires each and every element of the claim to be found within the cited prior art reference. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. *See M.P.E.P. 706.02(j); see also In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

As noted above, Claim 38 has been amended to require subarrays of at least about 10^6 single-wall carbon nanotubes. *Kiang-JPC* does not teach or suggest a subarray of at least about 10^6 single-wall carbon nanotubes and, therefore cannot be anticipated by or, in the alternative, obvious over *Kiang-JPC*. Claims 39 and 40 depend from amended Claim 38 and are not anticipated or obvious for the same reason that Claim 38, as amended, is not anticipated or obvious.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 39 and 40 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over *Kiang-JPC*.

¹ Applicant notes that there are many more than two nanotube types. The Application expressly indicates it has adopted the carbon nanotube nomenclature described by M.S. Dresselhaus, G. Dresselhaus, and P. C. Eklund, *Science of Fullerness and Carbon Nanotubes*, Chap. 19, especially pp. 756-760, (1996), which nomenclature reflects many more than two nanotubes types. Application, at 9, ll. 13-19. For instance, (10,10) nanotubes and (5,5) nanotubes are different types of nanotubes. *See Application, Original Claim 84* (directed to nanotubes of the “(10,10) type”). Furthermore, (5,4) and (7,4) nanotubes are different types of nanotubes, and, by definition, have different helicities.

IV. REJECTION UNDER 35 U.S.C. § 102(b) AS ANTICIPATED BY KIANG-CARBON

Examiner has rejected Claim 38 under 35 U.S.C. § 102(b) as being anticipated by Kiang et al. “Carbon Nanotubes with Single-Layer Walls,” *Carbon*, 33, 7, 903-914 (1995) (“Kiang-Carbon”). Office Action at 3.

Examiner contends that “Kiang et al. teaches bundling of single-walled nanotubes, which give rise to crystalline arrays. Kiang et al. shows two subarrays of single-walled nanotubes being aggregated into a composite array of nanotubes in Figure 2a (right side). The assembly of nanotube bundles during the formation of single-walled nanotubes is due to van der Waals forces. This occurrence represents a step of assembling a composite array of single-walled nanotubes from subarrays of single-walled nanotubes.” Office Action at 4.

As noted above, Claim 38 has been amended to require subarrays of at least about 10^6 single-wall carbon nanotubes. *Kiang-Carbon* does not teach a subarray of at least about 10^6 single-wall carbon nanotubes and, therefore cannot be anticipated by *Kiang-Carbon*.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claim 38 under 35 U.S.C. § 102(b) as being anticipated by *Kiang-Carbon*.

V. REJECTIONS UNDER 35 U.S.C. § 102(b) or § 103(a) OVER KIANG-CARBON

Examiner has rejected Claims 39-40 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over *Kiang-Carbon*. Office Action at 4.

Examiner applied Kiang et al. as above and noted that “from the applicant’s specification that the “type” of nanotube refers to its helicity, which is represented by helicity indexes of (n,m), of which there are two major types. Bundles of single-walled nanotubes consisting solely of each type of nanotube (i.e. the same helicity throughout) are expected to exist in a nanotube sample. Therefore, it is expected that the process of assembly composite arrays, or bundles,

takes place between subarrays, or bundles, of the same type as well as subarrays, or bundles, of differing types.” Office Action at 4.²

As noted above, Claim 38 has been amended to require subarrays of at least about 10^6 single-wall carbon nanotubes. *Kiang-Carbon* does not teach or suggest a subarray of at least about 10^6 single-wall carbon nanotubes and, therefore cannot be anticipated by or, in the alternative, obvious over *Kiang-Carbon*. Claims 39 and 40 depend from amended Claim 38 and are not anticipated or obvious for the same reason that Claim 38, as amended, is not anticipated or obvious.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 39 and 40 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) over *Kiang-Carbon*.

VI. ALLOWABLE SUBJECT MATTER

Examiner has objected to Claims 163-168 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Office Action at 4.

Applicant has now written claims 163, 164, 165 and 167 in independent form. Claim 166 continues to depend from now independent Claim 165. Claim 168 continues to depend from now independent Claim 167. Thus, the reason for objecting to these claims has been removed.

VII. CONCLUSION

As a result of the foregoing, it is asserted by Applicant that the Claims in the Application are now in a condition for allowance, and respectfully request allowance of such Claims.

Applicant respectfully requests that the Examiner call Applicant’s attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

² See footnote 1, *supra*.

Respectfully submitted,

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